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(71) Applicant: **ITW Automotive Products GmbH & Co.  
KG  
58636 Iserlohn (DE)**

(72) Inventors:  

- **Mawbey, Gerald  
65510 Idstein (DE)**
- **Fischer, Gerd  
97990 Weikersheim (DE)**
- **Och, Roland  
97228 Rottendorf (DE)**

(74) Representative: **Patentanwälte  
Hauck, Graafls, Wehnert, Döring, Siemons,  
Schildberg  
Neuer Wall 41  
20354 Hamburg (DE)**

(54) **A neck rest for the seat of an automobile**

(57) Divided neck rest for a seat of an automobile including the following features:

- a plate shaped first support portion which is adapted to be received by sockets in the back rest of the seat through neck rest rods,
- a plate shaped second support portion, with both support portions could be provided within an upholstery and have two relative positions that is a first position wherein the second support portion has approximately the same level as the first support portion and a second portion wherein the second support portion is elevated and removed in the direction of the automobile relative to the first support portion,
- a first spring means supported by the first support portion and having at least one leg a portion of the leg being rotatably connected to the second support portion and biases the second support portion into the second position
- a guiding element at the second support portion which is guided by guiding means of the first support portion during the displacement of the second support portion into the second and the first position
- a movable locking element biased by a second spring means on the first support portion which automatically blocks the second support portion in the second position,
- a locking element which is movably supported by the first support portion and adapted to be moved between a locking and a releasing position, the locking element cooperating with a locking projec-

tion of the second support portion facing the first support portion in the locking position thereof in order to lock the second support portion in the first position,

- a releasing element movably supported by the first support portion which in non-actuated position locks the locking element in the locking position,
- actuation means for the releasing element and
- supporting means between the first and the second support portion in the second position of the second support portion for the transfer of shock forces from the second support portion to the first support portion.

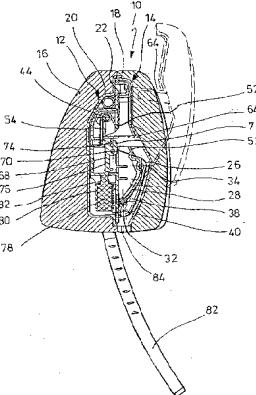


FIG. 2

## Description

**[0001]** The invention relates to a neck rest for the seat of an automobile according to claim 1.

**[0002]** DE 199 61 617 A1, DE 199 51 966 A1 or DE 101 42 625 A1 have made known a neck rest which has a supporting member adapted to be advanced to the front on the head of the seat used, and a shock member which actuates it. When there is an impact onto the rear end of the vehicle the shock member is actuated and the supporting member is advanced to the front. The supporting member is mounted on the upholstering carrier via pivoting arms. In DE 199 51 966 A1, the supporting member forms part of the neck rest upholstering which is composed of two components which are interconnected via joints. The shock member can interact with the supporting member via a pulling cable and be in communication with a releasing element.

**[0003]** DE 102 08 620 describes a neck rest for automobile seats which has a fixed support portion as well as a second support portion for a movable upholstering portion which is movably supported by the first support portion. The second support portion is pivotally supported about a lower horizontal axis on the first support portion and an actuation device is formed by a spring which biases the second support portion. A controllable locking device retains the second support portion in the retracted position on the first support portion. A third support portion is slidably mounted on the second support portion between a lower and an upper position. The third support portion is biased to the upper position by means of a second spring. A controllable second locking device retains the third support portion in the lower position with second locking device being unlocked once the second support portion has reached a predetermined pivoting angle. Further, stop means are provided between the second and third support portions and the first support portion when the second and third support portions have arrived at their extracted positions, to prevent the latter from pivoting back. The structure described last is intended to achieve an optimum absorption of force with the sitting person not undergoing a risk of injury when there is a rear-end shock.

**[0004]** It is the object of the invention to provide a divided neck rest in which simple means take care that if there is an impact against the automobile and an abrupt acceleration the head of the sitting person can be efficiently cushioned against an advanced and raised portion of the neck rest.

**[0005]** The object is achieved by the features of claim 1.

**[0006]** Like in the state of the art, the neck rest is also divided into a first and a second support portion in the invention, the first one being mounted on the seat by means of neck rest rods and the second one constituting the movable one. The first support portion mounts a first spring which has at least one leg which is rotationally supported by the second support portion and biases it

away from the first support portion. The second support portion has a guiding element which is guided by a guideway of the first support portion in displacing the second support portion from the first position to the second one, and vice versa. A movable locking element biased by a second spring on the first support portion automatically blocks the second support portion in its second position. A locking element is supported by the first support portion and is adapted to be moved between a locking and an unlocking position. In the locking position, it cooperates with a locking projection of the first support portion to lock the second support portion in the first position. A releasing element movably supported by the first support portion, when in a non-actuated position, blocks the locking element in the locking position. An actuation device acts on the releasing element to unlock the locking element when the releasing element is actuated.

**[0007]** In the inventive neck rest, the cooperation between the guiding element and guideway and the displacement path of the spring leg of the first spring determine the path of the second support portion during the displacement from the first position to the second one, and vice versa. The leg of the first spring firstly constitutes the actuator for the second support element and secondly forms a mounting for the second support portion in the second position thereof, in which second position supporting means are provided via which an impact onto the upholstering part of the second support portion is cushioned.

**[0008]** The components required for the displacement of the second support portion and its locking and supporting can be configured as being very simple and be assembled to be very compact. The releasing element can be selectively actuated in an electric or electromagnetic manner or via a pulling cable (Bowden wire), it being left open because of which physical event to release the releasing element. Thus, for example, a sensor responding to an acceleration is imaginable which causes a release of the neck rest once the acceleration rate exceeds a certain amount.

**[0009]** According to an aspect of the invention, a locking arm is disposed on that side of the second support portion which faces the first support portion. It interacts with a counter bearing in the upper part of the first support portion. According to an aspect of the invention, the counter bearing can have a deepening which is engaged by the end of the locking arm.

**[0010]** According to another aspect of the invention, the guiding element can be formed by a rod or pin or the like which are guided by parallel spaced guiding slots of the first support portion.

**[0011]** The locking element can be a blocking plate which is biased by the second spring into the blocking position where the rod or the pins interact with a blocking shoulder of the blocking plate when the guiding rod or when the guiding pins are displaced into the second position upon movement of the second support portion.

**[0012]** According to another aspect of the invention, the locking arm extending approximately horizontally, on the second support portion, can have a downwardly facing extension which engages an upwardly open locking recess of the locking plate which, in turn, is pivotally supported about a horizontal axis on the first support portion. It is understood that the extension and recess can also be interchanged, i.e. the locking arm can have a recess and the locking plate a relative extension which lockingly engages the recess.

**[0013]** The releasing element maintains the locking element in the locking position and is freed of the blocking element during a motion out of the blocking position. The releasing element can be linearly movable and be biased by a spring into the blocking position. The releasing element can be adapted to be actuated by an electromagnet, for example.

**[0014]** An embodiment of the invention will now be described in more detail below with reference to the drawings.

**[0015]** Fig. 1 shows a front view of the inventive neck rest with no upholstering component.

**[0016]** Fig. 2 shows a section through the neck rest of Fig. 1 taken along the line 2-2.

**[0017]** Fig. 3 shows a perspective view of the first support portion of the neck rest of Figs. 1 and 2 from the front with the second support portion, which is not shown, in a non-actuated condition.

**[0018]** Fig. 4 shows a view similar to that of Fig. 3, but with the second support portion actuated, though not shown in the drawing.

**[0019]** Fig. 5 shows a perspective view of the neck rest of Figs. 1 and 2 with the second support portion in an actuated condition.

**[0020]** A neck rest 10 for the back rest of a seat, which is not shown in detail, of an automobile has a first support portion 12 and a second support portion 14. An upholstering 16 for the support portion 12 and an upholstering 18 for the support portion 14 are shown in Fig. 2. The upholstering is omitted in the remaining Figures for reasons of representation.

**[0021]** The support portion 12 will initially be described in more detail below. As ensues from Figs. 2 to 4 it is composed of two plate shaped portions 20 and 22 which are manufactured from a plastic and are interleaved with each other as is specifically apparent from Fig. 2. The two portions 20, 22 define recesses or spaces to receive components yet to be described.

**[0022]** As ensues from Figs. 3 and 4, two parallel cheeks 24, 26 disposed at a spacing from each other are formed at the front of the portion 22. The cheeks 24, 26 have pivotally supported therebetween a blocking plate 28 about an axis 30. It is outwardly biased by a spring 32. The blocking plate 28 has a blocking shoulder 34 in the upper area. The spring 32 biases the blocking plate 28 outwardly. The cheeks 24, 26 have a slightly curved guiding slot 36, 38 each which obliquely extends upwards and in which a rod 40 is guided. The rod 40 is

in the lower area of the slots 36, 38 in Fig. 3 and is in the upper end of the slots 36, 38 in Fig. 4.

**[0023]** A recess 42 has supported therein two legged springs 46, 48 side by side on a rod-like bearing 44.

- 5 Each of them has a first leg 50 and 52 and a second leg 54, 56 at their outer ends. Both of the long legs 50, 52 are provided with a bent-away portion 58 at the end. The legs 54, 56 are fixed in place in a recess 60 of the portions 22 as they engage the recess 60 from above. In contrast, the legs 50, 52 are pivotable. The bent-away portions 58 engage respective holes of the second support portion 14 as can be seen from Fig. 5. The holes are formed in a hood-like portion 62 at the front of the second support portion 14 on the lateral walls. Only one portion 58 is shown in a hole of the hood-like portion 62 in Fig. 5. The legged springs 48, 50 are configured such as to bias the second support portion 14 into the upwardly and laterally extracted position as is shown in Fig. 5 and in phantom lines in Fig. 2. The limitation in
- 10 the position of the second support portion 14 in Figs. 2 and 5 is achieved by the fact that the rod 40 also extends into holes of the hood-like portion 62, which are not shown in detail, and is moved along together with the motion of the second support portion 14, as a result.
- 15 Thus, in the position shown in Fig. 5 for the second support portion 14, the rod 40 abuts against the upper end of the guiding slots 36, 38.

- [0024]** When the second support portion 14 is in the second position shown in Fig. 5 the rod 40 is adjacent to the blocking shoulder 34 of the blocking plate 28. Therefore, a force acting downwardly onto the second support portion 14 does not cause a displacement of the second support portion 14.

- [0025]** An arm 64 is formed to the rear of the second support portion 14. As is shown in the extracted second position of Fig. 5 and in phantom lines in Fig. 2 the free end of the arm 64 engages a horizontal deepening 66 of an extension 68 at the front of the first support portion 12 in the upper region as can be clearly seen in Figs. 3 and 4. This gives the second support portion 14 a horizontal support on the first support portion 12 when a force acts horizontally onto the second support portion 14 towards the first support portion 12.

- [0026]** A locking element 68 is pivotally supported horizontally about an axis 70 on the portion 22 of the first support portion 12. The locking element 68 is forked at 72 in the upper region and a downwardly projecting extension 74 of the supporting arm 64 engages the forked portion 72 in the first position of the second support portion 14 of Fig. 2. The downwardly facing portion 76 of the locking element abuts against the protrusion of an armature 78 of an electromagnet 80. The armature 78 is upwardly biased by a spring 82. This prevents the locking element 68 from pivoting and the second support portion 14 is held in place in the position illustrated in Fig. 2 although the legged springs 48, 46 are biased.
- [0027]** It should also be mentioned that the first support portion 12 has two neck rest rods 80, 82 which ex-

tend downwardly and in parallel at a spacing from each other and can be received in appropriate seats of the back rest of the automobile seat which are not shown. In Fig. 2, it can be seen that the rods 80, 82 are concavely bent as viewed from the bottom. Further, it should be mentioned that the upholstering 18 for the second support portion 14 leaves an opening 84 in the lower region to introduce a tool for pivoting the blocking plate 28 counterclockwise to allow the support portion 14 to be moved back again from the position shown in Fig. 5 to the position shown in Fig. 2. This is because pivoting the blocking plate 28 will release the rod 40, thus permitting the support portion 14 to be shifted downwardly against the force of the legged springs 46, 48. The blocking plate 28 can also be pivoted by hand when the second support portion 14 has been extracted as shown in Fig. 5. Then, the blocking plate 28 will be freely accessible in its lower region.

**[0028]** What can be recognized from Fig. 1 is that the neck rest rods 80, 82 are hollow and the rod 80 has passed therethrough a cable 84 which is led to the electromagnet 80 in order to activate it. The source which causes an activation of the electromagnet 80 is not shown. In an activation case, the armature 78 of the electromagnet 80 is moved downwards, thereby releasing the locking element 68. This enables the supporting arm 64 to pivot the locking element 68 by the extension 74 about the pivot pin 70 in a clockwise sense. This unblocks the locking device for the second support portion 14 and the second support portion is now pivoted forwards and upwards by means of the legs 52, 50 of the legged springs 46, 48 as is outlined in Fig. 5 and is also shown in phantom lines in Fig. 2. Guidance during the displacement of the support portion 14 is performed via the rod 40 within the guiding slots 36, 38 until they abut against the upper end of the guiding slots. While the rod 40 moves in the guiding slots 36, 38 the blocking plate 28, which is bent to the front in a slightly convex manner, is pivoted rearwards against the first support portion 12 against the spring 32 until the rod 40 grips behind the blocking shoulder 34. In this position of the second support portion 14, the supporting arm 64 has arrived at the extension 68 and the free end of the supporting arm 64 engages the transversely extending deepening 66 as is depicted in phantom lines in Fig. 2. In this manner, the location of the second support portion with the upholstering 18 is fixed in the extracted second position and forces which act onto the second support portion 14 and substantially are horizontal are transferred to the counter bearing 68 from the supporting arm 64, on one hand, and to the guiding slots 36, 38 from the rod 40, on the other.

**[0029]** In order to displace the support portion 14 back to the initial position from the second position, an object is introduced through the opening 84 of Fig. 2 by which the blocking plate 28 can be pivoted counterclockwise to cause the blocking shoulder 34 to release the rod 40. It will now be possible, by manual downward pressure,

to move the second support portion 14 back to the position shown in Fig. 2 with the rod 40 being moved along the guiding slot 36, 38 up to a lower stop. At this stage, the extension 74 of the supporting arm 64 engages the forked portion 72 of the locking element 68. This locks the second support portion 14 on the first support portion 12.

**[0030]** Instead of an electromagnet as is shown in Fig. 2, a releasing element can be used which acts in a way similar to the armature 78, but is actuated by a pulling cable, for example.

## Claims

1. Divided neck rest for a seat of an automobile including the following features:
  - a plate shaped first support portion (12) which is adapted to be received by sockets in the back rest of the seat through neck rest rods (80, 82),
  - a plate shaped second support portion (14), with both support portions (12, 14) could be provided within an upholstering (16, 18) and have two relative positions that is a first position wherein the second support portion (14) has approximately the same level as the first support portion (12) and a second portion wherein the second support portion (14) is elevated and removed in the direction of the automobile relative to the first support portion (12),
  - a first spring means (44, 46) supported by the first support portion (12) and having at least one leg (50, 52) a portion of the leg (58) being rotatably connected to the second support portion (14) and biases the second support portion (14) into the second position
  - a guiding element (40) at the second support portion (14) which is guided by guiding means of the first support portion (12) during the displacement of the second support portion (14) into the second and the first position
  - a movable locking element biased by a second spring means (32) on the first support portion which automatically blocks the second support portion (14) in the second position,
  - a locking element (68) which is movably supported by the first support portion and adapted to be moved between a locking and a releasing position, the locking element cooperating with a locking projection of the second support portion (14) facing the first support portion (12) in the locking position thereof in order to lock the second support portion (14) in the first position,
  - a releasing element movably supported by the first support portion (12) which in non-actuated position locks the locking element in the locking position,

- actuation means for the releasing element and supporting means between the first and the second support portion (12, 14) in the second position of the second support portion (14) for the transfer of shock forces from the second support portion (14) to the first support portion (12).

2. The neck rest of claim 1, wherein a locking arm (64) on the second support portion (12) forms a support means in that it co-acts with a counter bearing (68) at the upper portion of the first support portion (12). 10

3. The neck rest of claim 2, wherein the counter bearing (68) has a transversely extending deepening (66) which is engaged by the free end of the locking arm (64). 20

4. The neck rest of claim 1, wherein the guiding element is formed by a rod (40) or pins which are guided by two parallel spaced guiding slots (36, 38) of the first support portion (12). 25

5. The neck rest of claim 4, wherein a blocking plate (28) is biased into the blocking position by the second spring means (32), the blocking plate (28) being pivotally supported by the first support portion (12), and the rod (40) or the pinions engages a blocking shoulder (34) of the blocking plate (28) when the guiding rod (40) or the guiding pinions are displaced upon movement of the second support portion (12) into the second position. 30

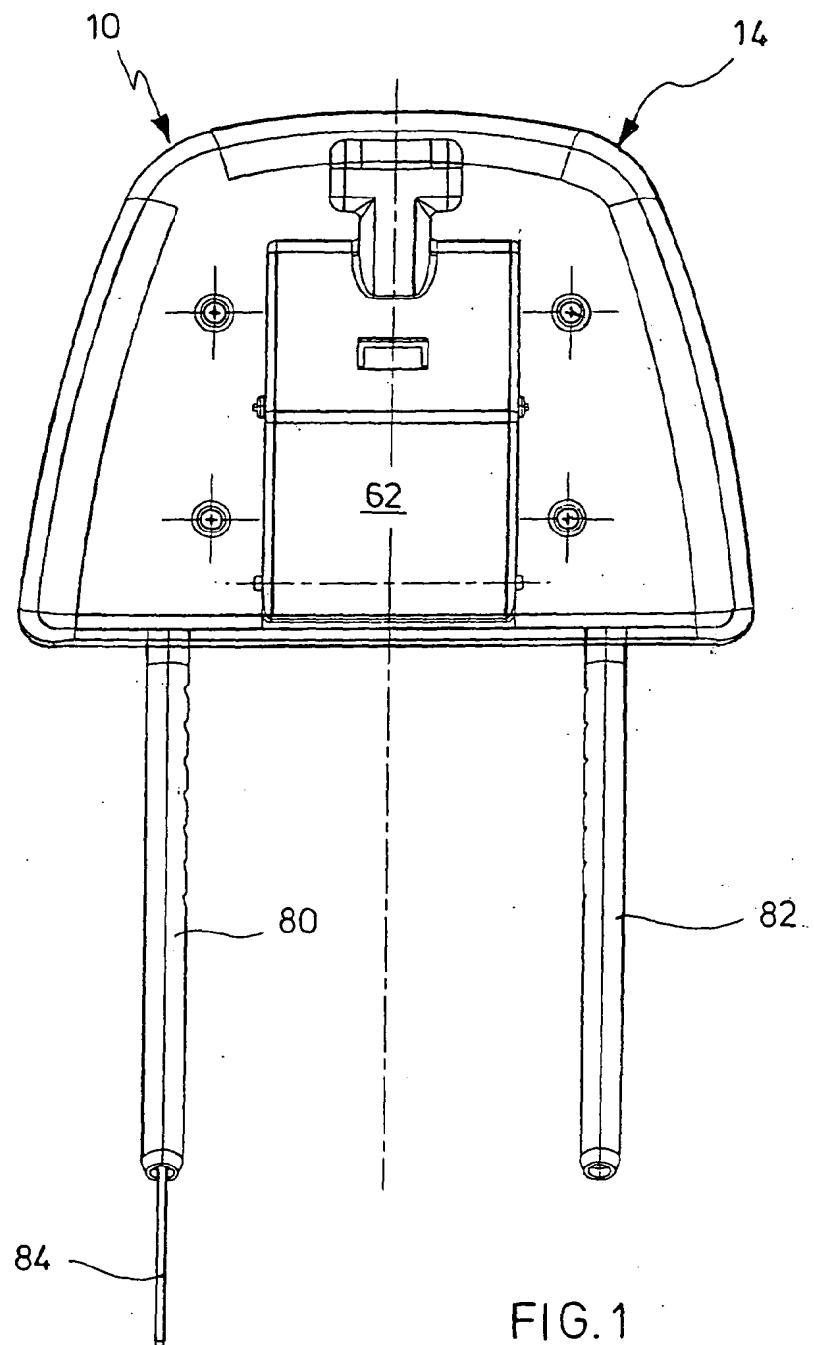
6. The neck rest of claim 1, wherein the approximately horizontally extending locking arm (64) has an downwardly facing extension (74) which engages a locking recess of the locking element (68) which in turn is pivotally supported by the first support portion (12) for rotation about a horizontal axis. 35

7. The neck rest of claim 6, wherein the releasing element is longitudinally movable between a releasing and a blocking position in the first support portion (12) and in the blocking position blocks the locking element (68) against a pivoting in the releasing position. 40

8. The neck rest of claim 7, wherein the releasing element (78) is biased into a blocking position by third spring means (82). 45

9. The neck rest of claim 7 or 8, wherein the releasing element (78) is actuated by an electromagnet (80). 50

10. The neck rest of claim 1, wherein the neck rest rods (80, 82) are bent each in a vertical plane towards the second support portion (14). 55



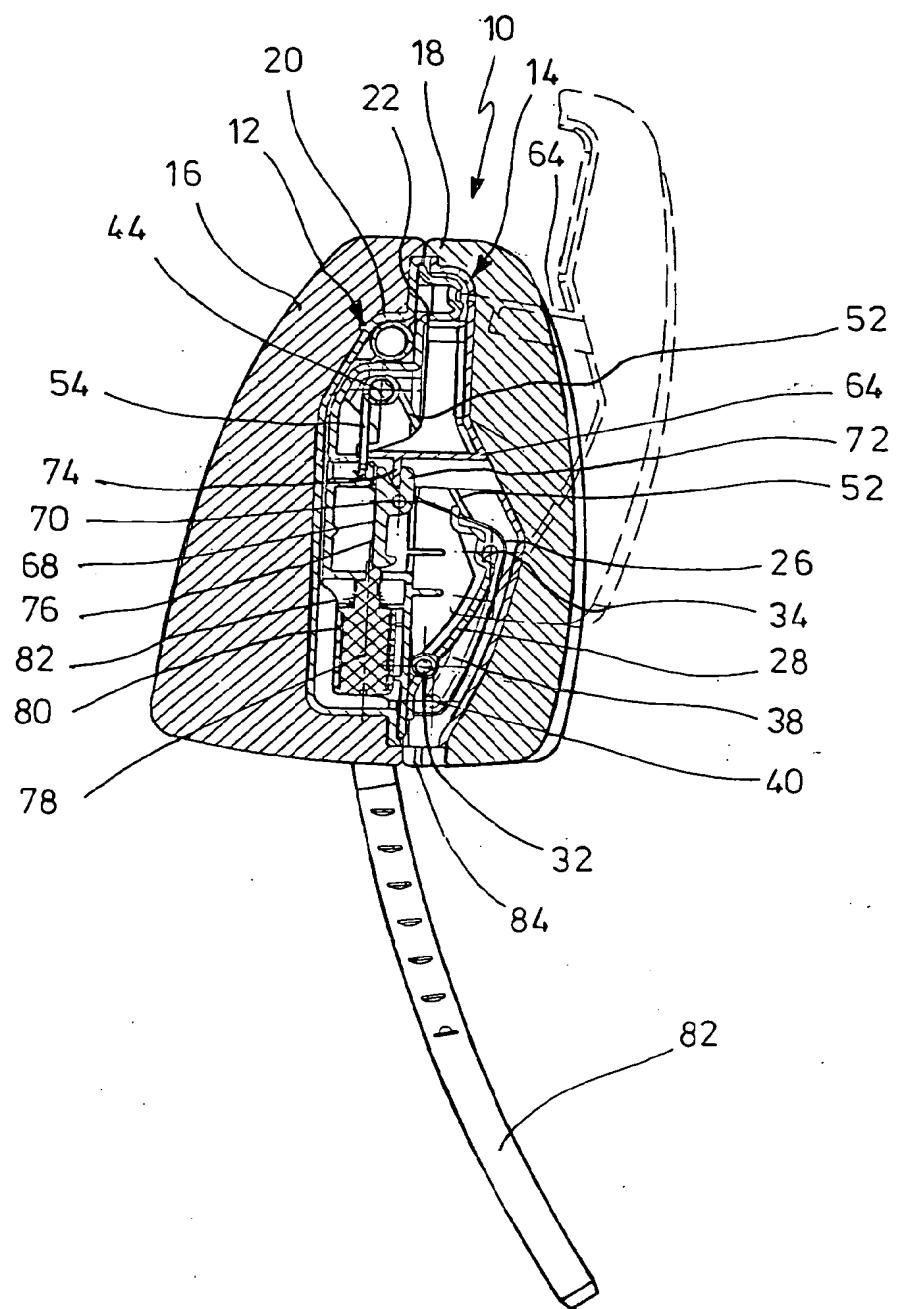


FIG. 2

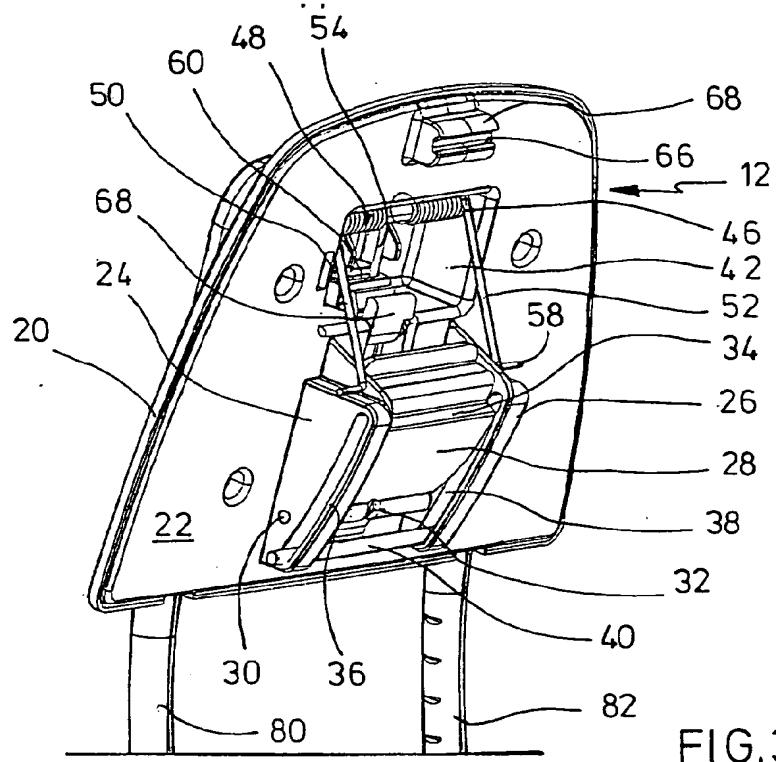


FIG.3

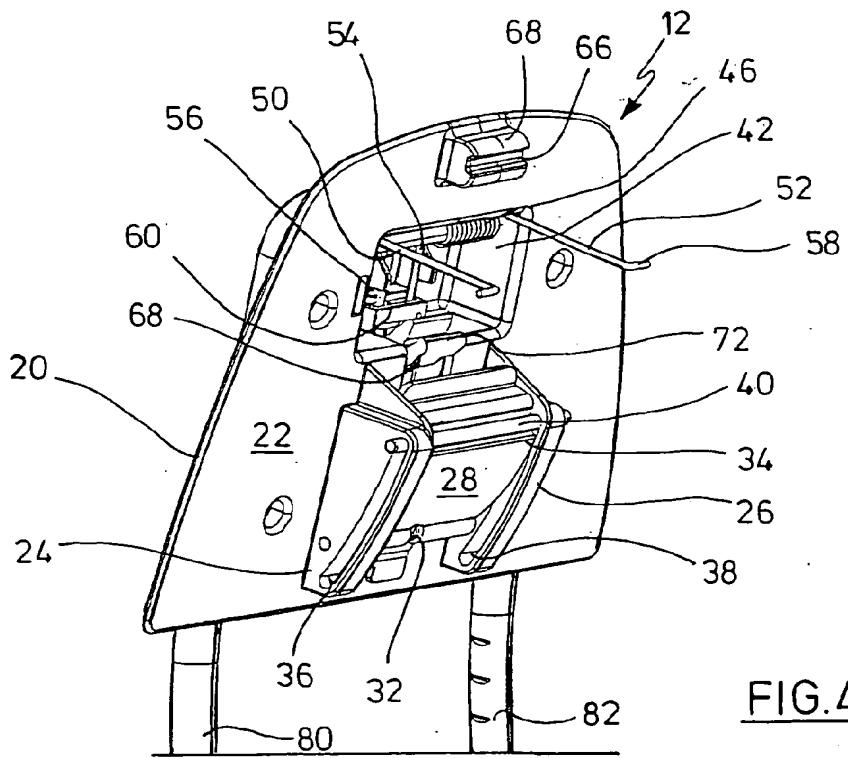


FIG.4

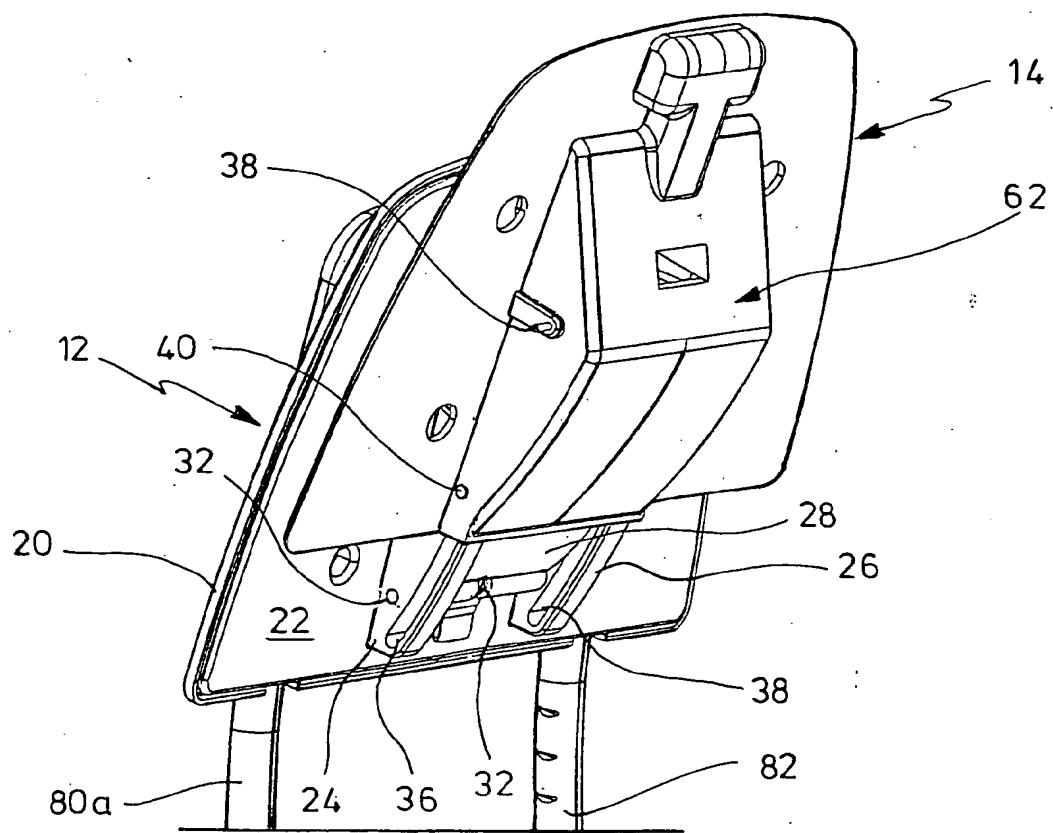


FIG. 5